

**Great Lakes-St. Lawrence River Basin Water Resources Compact
Five-Year Program Review Report - Draft
State of Michigan**

This report fulfills the State of Michigan's obligation under Section 3.4 of the Great Lakes-St. Lawrence River Basin Water Resources Compact (Compact), and under Article 300 of the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement).

General Information

1. Lead agency/agencies, contact person(s), and contact information.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) is the lead agency responsible for Michigan's water management and water conservation and efficiency programs.

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2. Laws, statutes, rules, regulations, executive orders, administrative orders, or other similarly enforceable documents that establish or implement programs meeting the requirements of the Compact.

The Compact is enacted into law in Michigan under Part 342, Great Lakes St. Lawrence River Basin Water Resources Compact, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

Additional legislation enabling specific aspects of Michigan's water management and water conservation and efficiency programs is enacted in:

- Part 327, Great Lakes Preservation, of the NREPA, 1994 PA 451, as amended;
- The Safe Drinking Water Act, 1976 PA 399, as amended; and
- The Safe Drinking Water Act Administrative Rules.

Specific provisions from the Compact and Agreement for water management and water conservation and efficiency program elements and their corresponding legal citations are provided below:

a. Compact Section 3.4/Agreement Article 300.

Michigan Compiled Laws (MCL) 324.34201

b. Compact Section 4.1/Agreement Article 301.

MCL 324.34201, 324.32702, 324.32705, 324.32707, 324.32708, 324.32710, 325.1004, Michigan Administrative Rules 325.11502, 325.11504

- c. **Compact Sections 4.2(2), 4.2(4) and 4.2(5)/Agreement Article 304.**
MCL 324.34201, 324.32707, 324.32708a, 324.32723, 325.1004
 - d. **Compact Section 4.3/Agreement Article 200.**
MCL 324.34201, 324.32704a, 324.32705, 324.32706a-e, 324.32723, 325.1004
 - e. **Compact Section 4.8, 4.9 and 4.13/Agreement Articles 200, 201, and 208.**
MCL 324.34201, 324.32701, 324.32702, 324.32703, 324.32703a, 324.32704, 324.32704a, 324.32727
 - f. **Compact Section 4.10/Agreement Article 206.**
MCL 324.34201, 324.32704a, 324.32705, 324.32706a-e, 324.32723, 325.1004
 - g. **Compact Section 4.11/Agreement Article 207.**
MCL 324.34201, 324.32723
3. **Major changes from Michigan’s 2019 Five-Year Program Review Report.**
No changes since 2019.

Water Management Program Report

1. **Water management program scope and thresholds.**

Michigan’s Water Use Program was established in 2008 to ensure Michigan continues to meet its obligations under the Compact and the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement. The program uses an online assessment tool to estimate the impact of proposed withdrawal by modelling the relationships between groundwater withdrawals, nearby stream flows, and fish populations. The purpose of the Water Use Program is to help Michigan fulfill its duty under MCL 324.32702 to effectively manage the waters of the state for the use and enjoyment of present and future residents and for the protection of the environment.

Michigan’s water management program includes registration and water use reporting requirements for virtually all large quantity withdrawals¹ (LQWs), as well as an authorization process for new or increased LQWs which requires that an environmental impact standard must be met prior to registration².

LQWs include all water withdrawals with the capacity to withdraw over 100,000 gallons per day (gpd) average in any consecutive 30-day period³. New or increased LQWs > 100,000 gpd that cannot be authorized by the on-line Water Withdrawal Assessment Tool must be authorized by a site-specific review or an alternative analysis of the proposed LQW⁴. New or increased LQWs > 2,000,000 gpd (2 MGD) require a permit⁵. Exceptions to the registration and reporting requirements include LQWs undertaken for groundwater contamination remediation, small residential properties, and hydroelectric power generation⁶.

¹ MCL 324.32705, 324.32707, 324.32708, 324.32723

² MCL 324.32706

³ MCL.324.32701

⁴ MCL 324.32706c

⁵ MCL 324.32723

⁶ MCL 324.32727

Registered LQW facilities annually report their monthly withdrawal volumes, consumptive use, and return flow discharge information on forms provided by EGLE or the Michigan Department of Agriculture and Rural Development (MDARD)⁷. Before new or increased LQWs can begin operating, they must be authorized based on an assessment of their predicted, cumulative impact along with other new LQWs to nearby river or stream flows. Large quantity withdrawals that are likely to exceed this environmental standard are restricted to a lesser amount, or they may be prohibited in order to protect local streamflow⁸. Michigan's management of withdrawals and water resources at the sub-watershed level ensures the protection of the waters of the Great Lakes Basin.

The [Water Use Advisory Council](#) (WUAC), established under Part 328, Aquifer Protection, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), continues to play an integral part of the program as it provides a platform for raising water withdrawal related issues and establishes an integrated framework of roles and responsibilities for all stakeholders in managing Michigan's water resources. This framework creates opportunities for the public, university researchers, industry professionals, advocacy groups, and other interested parties to be involved and to work directly with state agency personnel to set policy and shape the program's direction. This promotes better understanding and cooperation to the benefit of the program, and results in shared investment in the management and sustainability of Michigan's streams, lakes, wetlands, and groundwater.

2. Management of Water Withdrawals by:

- a. **Sector (public water supply, commercial and institutional, irrigation, livestock, industrial, electric power production (once-through and recirculated cooling), hydroelectric power production (off-stream and in-stream), voluntary, and other);**

With the exception of hydroelectric power generation, LQWs in all the above-mentioned water use sectors are subject to the Michigan water management program. Off-stream and in-stream hydroelectric water uses are exempt from management under Michigan law⁹. All sectors are managed in essentially the same way, and the specific sector of water use is captured in the annual water use reporting.

- b. **Water source (groundwater, Great Lakes-St. Lawrence River surface water, and other surface water);**

Large quantity withdrawals from all water sources including groundwater, the Great Lakes and their connecting waters, and other surface water are subject to the Michigan water management program. The specific water source is captured in the annual water use reporting. New LQWs are assessed based on the

⁷ MCL 324.32707, 324.32708

⁸ MCL 324.32706

⁹ MCL 324.32727

environmental impact to their source if they are from the Great Lakes or other surface water, or to nearby rivers or streams if the source is groundwater¹⁰.

c. Quantity (regulatory thresholds, volumes, rates, and reporting requirements);

The Michigan water management program regulates the quantity, volume, and/or rate of new or increased LQWs by tracking their cumulative impact to river and stream flows at a sub-watershed scale, or to fish populations or other uses of the lake for a direct withdrawal from a lake. The environmental impact standard is scaled to the size of the impacted stream or river and is dependent on its ecological classification. The regulatory limits are, therefore, variable across sub-watersheds¹¹ but are all based on the capacity of each system to support withdrawals. When the cumulative impact to a sub-watershed reaches the environmental impact standard limit, new or increased LQWs are restricted to a lesser amount, or they may be prohibited in order to preserve the local water resources¹². Large quantity withdrawals that withdraw less than 1,500,000 gallons of water in a given year are not required to report specific water use volumes, but they are required to file an annual report stating the water usage was less than 1,500,000 gallons¹³.

d. Location (Statewide/Province-wide or Great Lakes-St. Lawrence River Basin);

The Michigan water management program applies statewide.

e. Any specific exemptions as allowed in the Agreement and the Compact.

Michigan law includes exemptions from its water management program for LQWs undertaken for groundwater contamination remediation, small residential properties, and hydroelectric power generation¹⁴. Large quantity withdrawals utilized solely for fire suppression are exempt from the environmental impact standard, but they are required to register and report their annual water use¹⁵.

3. Application of the Standard of Review and Decision.

a. Decision Making Standard for Withdrawals and Consumptive Uses.

[MCL 324.32723](#): The Michigan water management program applies the Compact's Standard of Review and Decision to all new or increased withdrawals greater than two million gallons per day (MGD) capacity. An application for these withdrawals requires each criterion of the Decision-Making Standard to be addressed by the applicant and is evaluated by EGLE during the application

¹⁰ MCL 324.32706, 324.32723, 325.1004

¹¹ MCL 324.32701

¹² MCL 324.32706b, 324.32723

¹³ MCL 324.32707

¹⁴ MCL 324.32727

¹⁵ MCL 324.32721

review. Most criteria are evaluated on a scientific basis, with the exception of 4.11.5.c (the balance between economic development, social development, and environmental protection for the existing and proposed LQWs). For this criterion some deference is granted to the weight of public comments received on the proposed withdrawal to aid in EGLE's evaluation.

In addition to the Compact's Standard of Review and Decision, EGLE must also determine whether permit applications are reasonable under Michigan's common law for water uses. Michigan uses the "reasonable use balancing test" that evaluates: the purpose of the proposed use; the suitability of the proposed use to the location; the extent and amount of harm caused by the proposed use; the extent, duration, necessity, and application of the use, including any effects on the quantity, quality, and level of the water; and any other factor relevant under the circumstances of the particular case.

Large quantity withdrawals subject to Michigan's water management program, but less than two MGD capacity are required to meet an environmental impact standard. They are not evaluated by the Decision-Making Standard criteria.

b. Exception Standard for Diversions.

[MCL 324.32701](#): The Michigan water management program applies the Exception Standard and evaluates each criterion for any proposed Diversion. Under Michigan law, a diversion does not include the supply of ballast for vessels; use in a noncommercial project on a short-term basis for firefighting, humanitarian, or emergency response purposes; a transfer of water from a Great Lakes watershed to the watershed of its connecting waterways; or a transfer of water out of the Great Lakes Basin in a container 5.7 gallons or less.

4. Reporting and database of Withdrawals, Consumptive Uses, and Diversions.

Michigan's water management program requires annual water use reporting for virtually all LQWs. Separate databases of withdrawals, consumptive uses, and diversions are maintained by the agencies responsible for each branch of the Michigan water management program: EGLE's Community Water Supply Program for public water supplies, MDARD for agricultural water uses, and EGLE's Water Use Program for all other LQWs. Most large quantity withdrawal owners submit annual reports directly to EGLE's or MDARD's databases using an online reporting system, while a limited number of withdrawal owners instead utilize forms provided by the agencies. EGLE's Water Use Program staff compiles the annual water use reporting data for community water supplies, agricultural water uses, and all other water uses under EGLE's jurisdiction and submits the annual water use data to the Great Lakes Commission and others upon request. All methods of measurement of water use volumes are approved, as are acceptable estimation methods in lieu of a measurement device. A separate database is also maintained by the EGLE's Water Use Program to track the cumulative impact of new or increased LQWs relative to the environmental impact standard for each sub-watershed in the state¹⁶.

¹⁶ MCL 324.32706e

Regional notice is only required under the Compact when a proposed consumptive use (or the consumptive use portion of a proposed LQW) exceeds five million gallons per day (five MGD).

5. Withdrawal application forms.

Michigan's water management program utilizes an online application, the Water Withdrawal Assessment Tool (WWAT) to process all applications for new or increased LQWs up to two MGD capacity. Also, MCL 324.32706c provides for a site-specific review by EGLE or an alternative analysis of the proposed withdrawal submitted by a qualified hydrologist or hydrogeologist for any proposed withdrawals that cannot be authorized by the WWAT. A water withdrawal permit is required for new or increased LQWs greater than two MGD capacity. Information about all withdrawal application avenues can be found at <https://www.michigan.gov/wateruse>.

6. Initiatives to support an improved scientific understanding of the Waters of the Basin and an improved understanding of the groundwater of the Basin and the role of groundwater in Basin water resource management.

a. WUAC Recommendations.

The WUAC reports biennially to the Michigan Legislature, EGLE, MDARD, and the Michigan Department of Natural Resources (DNR). The WUAC released its first biennial report to the Legislature in December 2020 and its second biennial report in December 2022. The Council's recommendations have the potential to advance and improve data collection, modeling, research, and refine administration of the water withdrawal assessment process and Michigan's water conservation and efficiency program. Michigan's Quality of Life Agencies (EGLE, MDARD, and DNR) prioritize the recommendations in the Water Use Advisory Council's biennial reports and are implementing key recommendations with funding appropriated by the Michigan Legislature.

b. Temperature Logging Sensor Studies and Research to Water Withdrawal on Fish Communities.

The DNR, Fisheries Division, deploys temperature loggers to study stream temperatures and conducts fish population surveys in Michigan's lakes and streams. The DNR, through its Partnership for Ecosystem Research and Management (PERM) with Michigan State University (MSU), supports studies to evaluate the impacts of climate and the effects of cumulative withdrawal in a stream network. The project titled, "Improving Michigan's Water Withdrawal Assessment Tool (WWAT)" has the following objectives: 1) improve performance of WWAT by including cumulative withdrawals; and 2) determine effects of high-capacity groundwater withdrawal on downstream warming trends in streams. The research is funded by the United States Fish and Wildlife Service, State Wildlife Action Plan through the DNR, and by the United States Geological Service (USGS), Water Resources Research Act Program through the Institute for Water Research. Work in 2023 focused on characterizing changes in stream flow over time and associating patterns in stream flow with patterns in precipitation for select watersheds. This work is ongoing and will be supported further in 2024.

Downstream streamflow accounting and depletion research is proposed and in need of funding in 2024 and 2025.

c. USGS Monitoring Partnerships.

EGLE and the USGS have a joint funding agreement for operating stream gages and monitoring wells, as well as collecting miscellaneous stream flow measurements. Recent USGS work focused on characterizing changes in stream flow over time and associating patterns in stream flow with patterns in precipitation for select watersheds. EGLE and the USGS have joint funding agreements for operating stream gages and monitoring wells, as well as collecting miscellaneous stream flow measurements. The WUAC report contains recommendations to Michigan's Legislature to provide continued long-term funding for stream gages, miscellaneous flow measurements, and monitoring wells. USGS staff members from the Ohio-Kentucky-Indiana and the Upper Midwest Water Science Centers are developing a groundwater model for the Michindoh Aquifer (a glacial aquifer underlying portions of Michigan, Indiana, and Ohio). EGLE Water Resources Division is providing funding to EGLE Remediation and Redevelopment Division, Geological Services Section, to drill vertically nested monitoring wells (with the deeper wells screened in the Michindoh Aquifer) in the State of Michigan within the predicted zone of influence for AquaBounty's well field in Pioneer, Ohio.

EGLE received a grant from USGS to become a new data provider to the USGS' National Ground Water Monitoring Network (NGWMN). This is a two-year grant where EGLE will identify unimpacted monitoring wells that will be added to the NGWMN, create links between EGLE's groundwater database(s) and the NGWMN, and collect groundwater elevation data.

d. Groundwater Modeling Study

EGLE Water Resources Division (WRD) staff are reviewing available data to identify depleted watersheds where EGLE WRD staff can create their own groundwater models.

e. Geologic and Groundwater Research

The glacial geology of Michigan is quite complex and varied, and it is one of the major challenges in gaining a better understanding of Michigan's groundwater resources. The Michigan Legislature has authorized an annual budget of \$3 million per year beginning in 2022-2023 for the Michigan Geological Survey (MGS), the first annual funding in over 30 years. The MGS will map priority areas identified by EGLE, DNR and MDARD, plus other state and public recommendations. The MGS will also be supporting the EGLE Water Taskforce in developing a database to collect information on water quality and quantity. The MGS and EGLE are working to confirm, and correct when needed, the location of wells in the Wellogic database.

In addition to these data collection and monitoring efforts, for more than 25 years the USGS has operated the National Cooperative Geologic Mapping Program (NCGMP). This Federal cost share program is now expanded to geologically map the surficial glacial geology and collect samples to assess the glacial

material and support the development of the National USGS 3D surface and subsurface geological mapping products on a county-by-county basis. As of October 2022, the MGS has completed 23 3-D glacial geology quadrangle maps in Cass, Barry, and Calhoun Counties, has generated a Calhoun County map and has initiated the completion of the Cass County surficial geologic map. These map products include detailed surficial and bedrock maps at County scales. To meet National USGS mapping goals, the MGS is now mapping at a larger scale (1:62,500 scale) for county maps and submitted an Ottawa County map by the end of 2022 along with a draft Allegan and updated Kalamazoo County map to USGS, which will be open file at the MGS.

The discovery of Per- and Polyfluoroalkyl Substances (PFAS) at locations across the state has required expedited geologic and aquifer mapping and data compilation to identify and protect potential receptors from exposure to the contaminants. The Michigan PFAS Action Response Team (MPART) has contracted the MGS to complete this mapping and have prepared geologic and aquifer mapping packages for a total of 27 sites and compiled well data for an additional 37 sites through September 2022. Under the geological mapping contract, a total of 64 focused 2.5-mile radius area sites has been completed by the MGS's efforts.

Water Conservation and Efficiency Program Report

1. Water conservation and efficiency goals and objectives.

Michigan adopted goals and objectives consistent with the basin-wide conservation and efficiency goals and objectives set forth in Section 4.2(1) of the Compact on December 8, 2010 (Appendix 1). These goals and objectives were developed by the former Water Resources Conservation Advisory Council, a stakeholder forum of executive and legislative appointees that was established for collaborative study, evaluation, and advisement for Michigan's water management and water conservation and efficiency programs. Michigan's water conservation and efficiency goals and objectives continue to be met through the water conservation and efficiency program that was initiated with the adoption of the Compact.

The WUAC plays an integral part in Michigan's water management and water conservation and efficiency program. The WUAC collaboratively studies, evaluates, and provides advice regarding Michigan's water management, conservation, and efficiency programs. It also assists on technical issues, implementation, and monitoring overall progress of Michigan's water use and water conservation and efficiency program. This process promotes better understanding and cooperation to the benefit of the program and results in shared investment in the management and sustainability of Michigan's streams, lakes, wetlands, and groundwater.

Michigan's water conservation and efficiency goals and objectives continue to be met through the program that was initiated with the adoption of the Compact. Public comments on how to enhance Michigan's water conservation and efficiency program are being addressed through the proceedings of the WUAC and its committees.

Michigan continues to implement the [Michigan Water Strategy](#), an all-inclusive vision and blueprint to ensure Michigan's water resources continue to support healthy ecosystems, communities, and economies for current and future generations. Current state policy initiatives are focused on climate, energy, and water infrastructure investments which have resulted in more opportunities to guide programs toward sustainable water use. In addition, EGLE continues efforts with an interagency workgroup to create a collaborative strategy for statewide Great Lakes education and outreach programming focused on water stewardship. Appendix 2 provides a full list of water conservation and efficiency recommendations from the Water Strategy, as well as a link to the WUAC water conservation and efficiency recommendations.

2. Water Conservation and Efficiency Program Overview.

Michigan's water conservation and efficiency program is founded on the water withdrawal assessment requirement that applies to all new or increased large quantity withdrawals (LQWs)¹⁷. The assessment process evaluates proposed water withdrawals relative to environmental impact standards set for conserving and protecting the water resources of the Great Lakes Basin. The likely resource impacts of a proposed withdrawal must meet the environmental impact standard and be authorized by EGLE before the withdrawal can begin¹⁸. Large quantity withdrawals are cumulatively tracked and accounted for against the environmental standard at a sub-watershed scale, ensuring that the water resources of the basin are conserved even at a small scale.

Michigan's water conservation and efficiency program goes beyond the assessment process to comprise a comprehensive program of water use management. This program establishes an integrated framework of roles and responsibilities for private and public water users and governmental agencies in managing Michigan's water resources. Further, this framework creates opportunities for involvement by the public (e.g., local committees and volunteer efforts such as stream monitoring); universities (e.g., research and technical assistance); and other interested parties resulting in a latticework of shared investment in the sustainability of Michigan's lakes, streams, and groundwater.

In conjunction with annual water use reporting that is required for LQW, owners are required to review water conservation measures applicable to their water use sector. Implementation of conservation measures is voluntary¹⁹. In sub-watersheds that are approaching the environmental impact standard, as a condition of approval an applicant must implement the water conservation measures they deem to be reasonable²⁰. As a condition for approval of applications with a capacity greater than two MGD, the applicant must comply with sector or withdrawal-based water conservation measures²¹.

¹⁷ MCL 324.32705

¹⁸ MCL 324.32706, 324.32723

¹⁹ MCL 324.32707, 324.32708

²⁰ MCL 324.32706c, 325.1004

²¹ MCL 324.32723

3. Water conservation and efficiency program consistency with regional objectives, and promotion of Environmentally Sound and Economically Feasible Water Conservation Measures.

a. Guide programs toward long-term, sustainable water use.

Michigan continues to guide programs toward long-term water sustainability through the implementation of its water withdrawal assessment program. Michigan's LQW assessment process, environmental impact standard, and cumulative impact tracking system have effected significant changes in the planning and development of LQWs. This process has driven the integration of long-term sustainable water use concepts into water management decisions and has raised the awareness of water use and resource impact implications. The LQW assessment process is designed to be adaptive and able to respond to changing environmental conditions. Additional hydrologic data is continually being collected and combined with refined models to inform LQW assessment methods and policies to support better decision making and ensure long-term sustainable water use.

Additionally, the WUAC works collaboratively to continuously assess and improve the program based on new science, data, advancements in modeling and new technology. The WUAC created the Water Conservation and Efficiency Committee (WCEC) as a standing committee under the WUAC. The WCEC advises and makes recommendations to the WUAC on opportunities to improve and enhance Michigan's water conservation and efficiency program and support sustainable water use. The WCEC is working with state, academic, industry, and utility partners on projects and programs that advance water conservation and efficiency within Michigan's water sectors through best practices, improve public education on Great Lakes water conservation; accounting and measuring water and energy savings from water infrastructure improvements; and building public private partnerships with energy utilities to promote technical assistance and residential programs.

As part of the recommendations included in the WUAC 2020 biennial report, EGLE's Office of the Great Lakes (OGL) awarded a grant for a project to identify innovations and technological advancements in water conservation best practices that can benefit Michigan's water sectors. The project will summarize existing Michigan water sectors' processes to review and/or change water conservation best management practices (BMPs). The project will also research innovation and technological advancements in water sector water conservation BMPs and their impacts within the business and industry sectors in other Great Lakes states and provinces and other innovative jurisdictions. Funding is provided by the Michigan Great Lakes Protection Fund (MGLPF) and an appropriation by the Michigan Legislature to support implementation of the 2020 WUAC recommendations with funding through the American Rescue Plan Act.

One of the funded 2020 WUAC recommendations includes building more capacity to deliver existing education programs and trainings on water efficiency in the agricultural sector including animal industries. Educators plan to start their work in 2024 through a contract between EGLE, MDARD, and Michigan State University Extension.

EGLE is utilizing the Michigan Clean Diesel Program to replace diesel equipment, vehicles, and engines with zero tailpipe emission, hybrid, or alternative fuel vehicles, engines, or equipment. One of the types of equipment targeted are diesel agricultural irrigation pumps. Pumps replaced as part of this program will deliver carbon emissions reductions and improve efficiency of water usage.

Current state policy initiatives are focused on climate, energy, and water infrastructure investments which have resulted in more opportunities to guide programs toward sustainable water use. Efforts are ongoing by many actors across the state to implement Michigan's Water Strategy, the 30-year roadmap to ensure the viability and sustainability of Michigan's water resources for current and future generations. For example, in 2022, EGLE formed an interagency work group to develop a concept for creating a collaborative statewide Great Lakes education and outreach program focused on water stewardship. The group continued its work in 2023 and sought input from external partners delivering on-the-ground programming to refine the program concept and funding opportunity to address highest priority needs. Creation of a statewide education and outreach program on water conservation was also recommended in the WUAC's December 12, 2014, report.

b. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.

EGLE works with many water users and industry contractors through the assessment process on an individual basis to help implement withdrawals in an efficient manner that reduces the impact to water resources²². This assessment process incorporates both supply-side management of the water resources using a specialized database that tracks cumulative impact of withdrawals at the sub-watershed level, and demand-side management by notifying all affected water users when withdrawal limits begin to be approached in an area. Michigan's common law reasonable use doctrine is the legal foundation underlying the assessment process, and also promotes the conservation and efficient use of water in its own way when conveying to water users that water is a shared, finite resource under this doctrine. Users are encouraged to conserve up front, rather than when required to in the event of a conflict situation when supplies are limited or overtaxed. The LQW assessment process is designed to be adaptive and able to respond to changing environmental conditions.

²² MCL 324.32708, 324.32708a

c. Improve monitoring and standardize data reporting within water conservation and efficiency programs.

EGLE and MDARD collect annual water use reporting which includes reporting of water conservation and efficiency best practices. Some water use sectors (e.g., industry, public water supply) have better capabilities for accurate water use reporting since they meter their withdrawals and discharges. Measurement and evaluation of water conservation and water use efficiency, and changes over time, remain difficult to track from an agency perspective based on water use reporting data alone. Ongoing improvements to electronic data collection systems and databases and use of new tools are resulting in better consistency in water use data collection, and a better ability to identify trends in water use and account for variability. EGLE compliance staff continue to work on a case-by-case basis with property owners, well drillers, consultants, and other interested parties to bring newly discovered unauthorized LQWs and other violations of Part 327 into compliance.

State and federal agencies, research institutions, and stakeholders continue to assess available groundwater data and develop strategies for effective data integration to advance coordinated water monitoring programs and improve decision making. EGLE has prioritized investments in staff and resources to improve its technology and database management. Currently, data has been collected and is frequently compartmentalized to meet the needs of narrowly defined programs. Therefore, existing data is found in many locations and formats. Typically, the data is housed by categories of surface water (quantity and quality), groundwater (water levels, aquifer properties, and quality), geologic data (stratigraphy), climate data (precipitation, temperature, and evapotranspiration).

The WUAC Data Collection Committee developed recommendations for the biennial report to the Legislature for the creation of an Integrated Water Management Database. The purpose of the database would be to increase the effectiveness and efficiency of all water related programs in Michigan by making all these data easily accessible and in a common geospatial format. This effort should include obtaining groundwater data currently only available in paper form (e.g., monitoring well data collected under Part 115, Solid Waste Management; Part 201, Environmental Remediation; or Part 213, Leaking Underground Storage Tanks, of NREPA). Michigan's water programs rely on sophisticated models and technical analyses to accomplish their goals. These all require high quality data, and enough data to adequately define water resources in Michigan to make proper management decisions.

As part of the effort to make data more accessible, the Michigan Hydrologic Framework (MHF), another recommendation from the WUAC, would facilitate the creation of models to support statewide sustainable water management of both surface water and groundwater. The MHF recognizes the critical importance of accessing a wide range of water-related data. The MHF will be linked to the EGLE Groundwater Data Management System.

Multiple divisions in EGLE are collaborating in developing the Michigan Groundwater Data Warehouse Lean Process Improvement project. EGLE's Groundwater Data Management System will provide a common location and format for groundwater data submitted by EGLE staff and external parties. The data management system will be expanded in future phases to include other environmental media besides groundwater. The Groundwater Data Management System has a lot of overlaps with the Integrated Water Management Database mentioned previously. The Michigan Integrated Water Management Database project will be incorporated into the implementation of the Michigan Hydrologic Framework project. The data management system will be linked to Geographic Information System (GIS) data layers for visual presentation of data as well as being linked to other external databases (e.g., federal agencies' databases).

Responses to the request for proposals for the Groundwater Data Management System are under review by EGLE and the Michigan Department of Technology, Management and Budget. Work on the Groundwater Data Management System is expected to begin in the second quarter of calendar year 2024.

The WUAC recommendations are consistent with Michigan's Water Strategy, which also includes a recommendation to create a coordinated strategy for groundwater data collection, including a data management system. Such data is a critical measurement and indicator of the effects of water use and the effects of water conservation and efficiency practices. The WUAC 2022 recommendations, in most cases, require Michigan's Legislature to appropriate additional funding in order to be implemented.

Other efforts underway to improve data collection include the work of the Michigan Infrastructure Council and the Michigan Water Asset Management Council. Both Councils were created in statute to develop and direct implementation of a statewide strategy to standardize and streamline data collection, storage, and analysis related to infrastructure. EGLE continues to provide financial support for asset management planning for water utilities through grants under its drinking water asset management program, in addition to providing Stormwater, Asset Management, and Wastewater Program (SAW) grants and technical assistance.

d. Develop science, technology, and research.

Michigan is actively developing science, technology, and research on an ongoing basis through the efforts of various projects by state, federal, and academic institutions. Significant investments have been made as funding is available to further these developments. The WUAC convenes scientific and policy discussions amongst stakeholders and technical experts to evaluate Michigan's water management and water conservation and efficiency programs and to identify where improvements could be made.

Michigan is funding several research projects in high water use areas to better understand the groundwater-surface water interaction. This data will be used to improve the assessment and forecasting of new water uses' impact on the resource through increased use of site-specific data and more localized regional models. Increasing and improving the quality of data is imperative to effectively promote proactive conservation and efficient use to water users before shortage issues occur. The initiatives undertaken to support a scientific understanding of the Waters of the Basin and an improved understanding of the groundwater of the Basin and the role of groundwater in Basin water resource management, as part of Michigan's Water Management Program, develop new science to support this section of the Water Conservation and Efficiency Program.

The Michigan Great Lakes Protection Fund exists as a dedicated funding program to support research to improve scientific understanding of Great Lakes issues. The fund is administered by the Michigan Office of the Great Lakes.

e. Develop education programs and information sharing for all water users.

Michigan has several new and ongoing outreach and education programs that provide information about water conservation and efficiency and promote water stewardship principles and practices. Efforts are also ongoing to promote water stewardship through effective statewide communication strategies to improve the public's understanding of their impact on water resources and actions and behaviors that support responsible water use.

Presentations, Conferences, Webinars, and Trainings.

EGLE and MDARD staff make educational presentations at meetings and various conferences as well as share information upon request, to a variety of interested parties. The WUAC and its subcommittee meetings are open to the public and provide educational opportunities and information sharing for water users and water managers about Michigan's ongoing program implementation. Meeting notes and informational materials from the WUAC proceedings are posted on an EGLE webpage.

EGLE continues to increase public awareness of water use information and access to data by publishing additional water use data online, holding public information meetings, and utilizing various media outlets. In addition, EGLE provides webinars, conferences, training, and information for businesses and industry to support enhanced water conservation and efficiency.

Outreach for Agricultural Irrigators.

MSU Extension convenes meetings and on-site trainings around the state with agricultural water users to share information about conservation practices for irrigation.

Fix a Leak Week.

EGLE's Office of the Clean Water Public Advocate promotes the United States Environmental Protection Agency's (USEPA) Fix a Leak Week each March. Fixing leaks can save money, energy, and reduce health risks for individuals and communities. During this week, EGLE encourages Michiganders to find and fix household leaks, shares educational and how-to materials, and promotes water conservation resources available to Michigan residents.

Source Water Protection Webinar Series.

EGLE has begun hosting a webinar series on Source Water Protection topic in partnership with Michigan State University's Institute of Water Research and Michigan Rural Water Association (MRWA). The series titled "Drinking Water: Protecting MI Source," hosted three webinars as of October 2023. The series kicked off on May 23, 2023, with a presentation titled "Healthy Forests Protect Drinking Water" featuring the Forests to MI Faucet Michigan Department of Natural Resources initiative discussing how this program promotes clean source water. The second webinar in the series, "Drops of Resilience: Empowering Communities through Source Water Plans," featuring MRWA's Source Water Protection Specialist presenting on the development and implementation of source water protection plans. The third webinar hosted to date, "Blooming Waters: Understanding Harmful Algal Blooms and Safe Drinking Water," featured EGLE's Water Resources and Drinking Water and Environmental Health Division's experts on cyanotoxins and sampling efforts around the state to identify them in the source water at community water supplies across Michigan. The events have been attended by steadily increasing audiences of more than 300 attendees by community water supplies, watershed organizations, local public health staff, consultants, the public and others to learn more about important topics related to source water protection. Future webinars will continue to feature current and relevant topics with case studies and examples of how source water programs are working in other states.

Michigan Water School.

MSU Institute of Water Research, MSU Extension, and Michigan Sea Grant continue to offer the Michigan Water School now available in an online module series. This program is focused on educating local appointed and elected officials and staff about critical, relevant information needed to understand Michigan's water resources to support sound water management decisions. The program includes modules on water quantity, water quality, water finance and planning, and water policy issues. Topics covered include the Blue Economy, fiscal benefits of water management, incorporating water into local planning and placemaking, resources to help address water problems, water policy at the federal, tribal, state, and local levels.

From Students to Stewards Initiative.

In 2020, EGLE launched an initiative to integrate water literacy principles in K-12 school curriculum, in partnership with the Michigan Departments of Labor and Economic Opportunity, Education, and Natural Resources, along with

numerous community partners. This effort, called the From Students to Stewards Initiative, is intended to develop a life-long culture of stewardship by integrating Great Lakes and freshwater literacy principles into standards-based school curricula through place-based, authentic-experience approaches to improve stewardship behavior and provide an engaging context to motivate school performance. This initiative will teach STEM concepts using place-based, problem-based, and project-based approaches with a focus on Great Lakes literacy principles to foster the next generation of water stewards, leaders, skilled workers, and decision makers needed to solve complex water issues in a changing world. Six Michigan school districts participated in Phase 1 of the program to integrate water literacy principles and place-based education into school curricula and their continuous improvement plans. The program includes a toolkit and roadmap that other schools can use to develop their own Great Lakes-based curriculum to cultivate the next generation of water stewards.

EGLE secured additional funding from the USEPA Great Lakes Restoration Initiative through the Great Lakes Restoration Initiative Program to implement Phase 2 of the From Students to Stewards Initiative in the 2022 and 2023 academic years. Phase 2 supported grants to 16 schools; interaction between Phase 1 and 2 cohorts, and additional program evaluation. A total of 22 schools have participated in the program.

Great Lakes Fresh Water Week.

EGLE and its partners host an annual Great Lakes and Fresh Water Week to celebrate Michigan's water resources, encourage Michigan residents to experience water resources, become educated about water resources, and take action to become water stewards. Recent efforts have also focused on building the water workforce.

Water Conservation Webinar.

EGLE hosted a webinar about in-home water conservation in August 2023. The webinar featured presentations about the USEPA's Water Sense program, indoor water fixtures, home irrigation and water-efficient landscaping, especially in the context of climate change.

EGLE Classroom.

EGLE helps educators, youth, and families access resources they need to learn about Michigan's environment, EGLE's work to protect it, and what they can do to participate in that work through EGLE Classroom. Operated by EGLE's Environmental Education program, EGLE Classroom provides Michigan-based environmental curriculum, free hands-on resources to classrooms, professional development opportunities for educators, and video lessons on Michigan's environment and environmental careers. EGLE Classroom also administers the Michigan Green Schools certification program and hosts an annual Earth Day educational event. To view EGLE's environmental education opportunities or to borrow a hands-on activity from

the [Environmental Education Lending Station](#), visit Michigan.gov/EGLEclassroom and follow #EGLEClassroom on social media.

Integrated Assessments for Sustainability.

EGLE's Sustainability Section provides a variety of on-site, direct assistance services to help businesses and communities meet their sustainability goals. Benefits of the integrated assessments include an increase of efficiencies and cost savings, elimination/minimization of waste streams, conservation of energy and water resources, and mitigation of risks and the potential for noncompliance.

EGLE also holds a Sustainability Webinar series promoting sustainability practices targeted toward businesses and industries in the water sector. EGLE has reinstated its program formerly known as RETAP (Retired Engineer Technical Assistance Program) with a new program called Retired Engineers, Scientists, Technicians, Administrators, Researchers, and Teachers (RESTART). RESTART provides assistance to institutions, government agencies and businesses with 500 or fewer full-time employees with on-site energy and sustainability assessments.

Forest to Mi Faucet.

The DNR launched a three-year initiative called Forest to Mi Faucet. The DNR Forest Stewardship Program is leading twenty partners in connecting conservation groups to municipal water utilities and educating woodland owners about the relationships between forests and drinking water. Forest to Mi Faucet will strategically plant more than 800,000 trees to maintain or enhance water quality benefits.

The project builds on the federal [Forests to Faucets 2.0](#) analysis of priority watersheds for protecting surface drinking water. The analysis, [detailed in an interactive story map](#), identifies watersheds with potential for forest protection or restoration.

Forest to Mi Faucet has six components:

1. Help 15+ municipal water utilities implement their source water protection plans.
2. Protect forests in important watersheds through conservation easements, nature preserves, etc.
3. Manage forests better with forest certification and Master Loggers using best management practices.
4. Expand forests by planting 80,000 trees in strategic urban and rural riparian zones to reduce pollution runoff.
5. Ecological restoration of forests for water quality with prescribed fire and reducing invasive species.
6. Educate landowners and the public about connections between forests and their drinking water.

The goal of Forest to Mi Faucet is to build the foundation for a program to provide payment for ecosystem services where forest owners are compensated for practices that provide clean water. Forest to Mi Faucet is

funded by United States Department of Agriculture, Forest Service. All partners are equal opportunity providers and employers. More information is at www.Michigan.gov/ForestToMiFaucet.

4. Water conservation and efficiency program implementation timeline and status.

All components of Michigan's water conservation and efficiency program have been implemented. The foundation of the program, the water withdrawal assessment process, has been fully in effect since July 2009. Sector-based water conservation measures have been developed and are in use. Additional state funding resources have recently been allocated to bolster program areas of need. From the beginning, it has been acknowledged that the program would continually adapt and that the staff would be open to changes necessary for improvement and enhancement. Michigan has shown strong commitment to this forward-looking approach and seeks to remain vigilant for the betterment of the program and to uphold the ideals of the Compact.

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APPENDIX 1: MICHIGAN WATER CONSERVATION AND EFFICIENCY PROGRAM

Water Conservation and Efficiency Goals and Objectives

Goals

1. Ensuring improvement of the waters and water dependent natural resources;
2. Protecting and restoring the hydrologic and ecosystem integrity of the Basin;
3. Retaining the quantity of surface water and groundwater in the Basin;
4. Ensuring sustainable use of waters of the Basin; and,
5. Promoting the efficiency of use and reducing losses and waste of water.

Objectives

1. Utilize Michigan's Water Use Program and Water Withdrawal Assessment Process to guide long-term sustainable water use.
 - a. The programs will be adaptive, goal-based, accountable, and measurable.
 - b. Continue to develop and implement programs openly and collaboratively with local stakeholders, Tribes and First Nations, governments, and the public.
 - c. Prepare and maintain long-term water demand forecasts.
 - d. Develop long-term strategies that incorporate water conservation and efficient water use practices.
 - e. Review and build upon existing planning efforts by considering practices and experiences from other jurisdictions.
2. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.
 - a. Maximize water use efficiency and minimize waste of water.
 - b. Promote appropriate innovative technology for water reuse.
 - c. Conserve and manage existing water supplies to prevent or delay the demand for and development of additional supplies.
 - d. Provide incentives to encourage efficient water use and conservation.
 - e. Consider water conservation and efficiency in the review of proposed new or increased uses.

- f. Promote investment in and maintenance of efficient water infrastructure.
3. Improve monitoring and standardize data reporting among State and Provincial water conservation and efficiency programs.
 - a. Improve the measurement and evaluation of water conservation and water use efficiency.
 - b. Encourage measures to monitor, account for, and minimize water loss.
 - c. Track and report program progress and effectiveness.
4. Develop science, technology, and research.
 - a. Encourage the identification and sharing of innovative management practices and state of the art technologies.
 - b. Encourage research, development, and implementation of water use and efficiency and water conservation technologies.
 - c. Seek a greater understanding of traditional knowledge and practices of Basin First Nations and Tribes.
 - d. Strengthen scientific understanding of the linkages between water conservation practices and ecological responses.
5. Develop education programs and information sharing for all water users.
 - a. Ensure equitable public access to water conservation and efficiency tools and information.
 - b. Inform, educate, and increase awareness regarding water use, conservation, and efficiency and the importance of water.
 - c. Promote the cost-saving aspect of water conservation and efficiency for both short- and long-term economic sustainability.
 - d. Share conservation and efficiency experiences, including successes and lessons learned across the Basin.
 - e. Enhance and contribute to regional information sharing.
 - f. Encourage and increase training opportunities in collaboration with professional or other organizations to increase water conservation and efficiency practices and technological applications.
 - g. Ensure that conservation programs are transparent, and that information is readily available.

h. Aid in the development and dissemination of sector-based best management practices and results achieved.

i. Seek opportunities for the sharing of traditional knowledge and practices of Basin First Nations and Tribes.

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APPENDIX 2: WATER CONSERVATION AND EFFICIENCY RECOMMENDATIONS FROM MICHIGAN'S WATER STRATEGY

Goal 1: Michigan citizens are stewards of clean water and healthy aquatic ecosystems.

Recommendations:

1-2: The State, working with stakeholders, will develop a public outreach campaign that highlights stewardship practices and encourages actions that sustain water resources.

Goal 2: Michigan's aquatic ecosystems are healthy and functional.

Recommendations:

2-8: Incorporate planning for wet weather extremes, droughts, and increased seasonal variability of precipitation into state, regional, and community planning to mitigate impacts to ecological, economic, social, and cultural resources.

2-11: The State, working with tribal governments and stakeholders, will establish new partnerships to develop innovative strategies to enhance wetland restoration and green infrastructure efforts in Michigan. The Tribes will work with the State to elevate the recognition, protection, and restoration of native wild rice stands throughout the state.

2-14: Refine and improve the water withdrawal assessment process and model to ensure sustainable use of water resources and that high priority is given to incorporating existing and new data to better represent local and regional water resources and surface water/groundwater interactions.

2-15: Provide technical and financial support to communities and their partners to plan and implement green infrastructure techniques and low-impact development while preserving natural spaces that contribute to water quality, including application of these techniques in the design of new developments, redevelopments, and road projects to ensure storm water management, improved hydrology, and overall water quality.

2-16: Modernize road and highway planning and infrastructure and integrate with watershed planning to effectively accommodate storm water runoff and infiltration needs, thereby reducing the costs and impacts of flooding.

2-17: Enhance financial and technical support of local stakeholder efforts to develop and implement watershed management plans to restore impaired waters, protect high quality waters, and develop and utilize local water resource assets.

Goal 3: Michigan communities use water as a strategic asset for community and economic development.

Recommendations:

3-1: Emphasize water resources as assets in state, regional, and community planning efforts to provide appropriate, sustainable protection and to fully leverage community-based economic opportunities.

Goal 5: Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.

Recommendations:

5-3: Establish voluntary water efficiency targets for all major water sectors to reduce water use impacts and costs.

5-4: Promote innovative technologies that reduce cost and water loss or convert waste products to usable materials.

5-5: Develop a water conservation and reuse strategy for the State, local governments, and public and private facilities that incorporates the use of green infrastructure, grey water systems, and energy production that includes recognition programs.

5-6: Fund a pilot project, through a competitive bid process, for the initiation and evaluation of a new model for wastewater management. This pilot program will assess the opportunities and barriers to creating a “Water Resources Utility of the Future,” focused on:

- Reclaiming and reusing water
- Extracting and finding commercial uses for nutrients and other constituents
- Capturing waste heat and latent energy in biosolids and liquid streams
- Generating renewable energy using its land and other assets
- Using green infrastructure to manage storm water and improve urban quality of life

5-7: Define measures of agriculture water conservation and establish voluntary targets for utilizing best management practices (BMPs) that reflect conformance with the Irrigation Water Use Generally Accepted Agricultural and Management Practices in areas of existing or potential water stress.

5-8: Enhance voluntary water conservation measures through technology and outreach for agriculture to optimize water use while reducing impacts and costs.

Goal 8: Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.

Recommendations:

8-1: Develop a coordinated, comprehensive monitoring strategy for groundwater quantity and quality, including a data management system.

8-2: Secure a long-term, sustainable funding source for groundwater and surface water quality and quantity monitoring that is continually improved with new technologies.

8-3: Implement a pilot decision-support framework that includes monitoring, data and information, and analytical tools. This framework will assess ecological, economic, social, and cultural values and outcomes at local and regional watershed scales.

Goal 9: Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.

Recommendations:

9-3: Uphold the Great Lakes Compact and Agreement by actively participating in the Great Lakes-St. Lawrence River Regional Body and Great Lakes-St. Lawrence River Compact Council including financial support of these entities entrusted to govern the Compact and Agreement.

9-4: State and Tribal governments will meet on an ongoing basis to discuss and develop strategies to support management of Michigan's shared water resources. The State and Tribal governments will jointly develop agendas reflecting the priorities of all parties involved.

APPENDIX 3: SUMMARY OF PUBLIC OUTREACH ACTIVITIES AND COMMENTS RECEIVED

In addition to the internal contribution and review from Michigan agencies and requirements in compliance with the Compact, EGLE conducted the following activities to include Tribal government perspective and public comments into this 5-year review report:

- Distribute draft 5-year review report to Michigan federally-recognized Tribes.
- Present the report for a 45-day public comment period (July-August 2024)
- Hold Government to Government consultation with Michigan federally-recognized Tribes. (September 2024)

Comments received were organized in the following categories and were addressed in the report:

- TBD (this section will be populated after the public comment period)